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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,268	04/26/2000	Whonchee Lee	150.0056 0102	2517

7590 12/04/2002

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EXAMINER
DEO, DUY VU

ART UNIT	PAPER NUMBER
1765	19

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No.	Applicant(s)	
	09/560,268	LEE ET AL.	
	Examiner	Art Unit	
	DuyVu n Deo	1765	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *64,65 and 67-95* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *64,65 and 67-95* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *17* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 68-70, 72-75, 77-81, 83-86, 88-91, 93 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiramizu (US 6,116,254).

Shiramizu teaches a solution that is well known to one skilled in the art comprising: HCl, 37 wt%, H2O2, 30 wt%, and pure water (DI water) and they have a ratio of 1:1:6 respectively (col. 1, line 29-33).

Referring to claims 68, 72, 73, 77, 79, 84, 89, this solution would inherently have metal nitride etch rate of about 50 angstrom/min to 250 angstrom/min and cobalt etch rate greater than about 1000 angstrom/min because it is made from essentially the same concentration of each

chemical as that of claimed invention. HCl is at 37 wt % comparing to claimed 37 wt%, H2O2 is at 30 wt % comparing to claimed 29 wt %, and the ratio of these chemical is within claimed ratio, HCl:H2O2:H2O as 1:1:6.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 64, 65, 67, 71, 76, 82, 87, 92-95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiramizu as applied to claims 68, 73, 81, 86, 91 above.

Unlike claimed invention, Shiramizu doesn't describe the range of HCl:H2O2:H2O ratio is from 1:1:25 to 1:1:10 and using a H2O2 having a concentration of 29 wt%. His ratio is 1:1:6 and his H2O2 being used having a concentration of 30 wt%. However, it is obvious that more water or less concentrated chemicals would dilute the chemical and weaken the solution and less water or more concentrated chemicals would strengthen the solution; therefore, one skilled in the art would find it obvious to determine the chemical ratio through test runs depending on what type of material the solution is used on, in order to achieve a solution to remove metal contaminations or etch metal with an expected of reasonable result.

5. Claims 64, 65, 67-95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano (US 6,110,839) and Shiramizu (US 6,116,254).

Nakano teaches a solution (claimed etching composition) comprising: HCl (claimed mineral acid), H2O2 (claimed peroxide), and water with their respective ratio of 1:1:10 (col. 6, line 39-44). Unlike claimed invention, Nakano is silent about using DI water; however, using DI or pure water to prepare similar chemical bath is well known to one skilled in the art as shown by Shiramizu (col. 1, line 32), and would have been obvious so that the chemical bath doesn't contain other contamination.

Referring to claims 68, 72, 73, 77, 79, 84, 89, this solution would inherently have metal nitride etch rate of about 50 angstrom/min to 250 angstrom/min and cobalt etch rate greater than about 1000 angstrom/min because it is made from essentially the same concentration of each chemical as that of claimed invention. HCl is at 36 wt % comparing to claimed 37 wt%, H2O2 is at 30 wt % comparing to claimed 29 wt %, and the ratio of these chemical is within claimed ratio, HCl:H2O2:H2O as 1:1:10.

Referring to claim 94, unlike claimed invention, Nakano doesn't describe HCl and H2O2 being used have a concentration of 37 wt% and 29 wt% respectively. However, he teaches HCl and H2O2 having concentration of 36 wt% and 30 wt% respectively. These concentration would essentially is the same as claimed concentration. It would have been obvious at the time of the invention for one skilled in the art that the final concentration being used would depend on the desired etch rate and material being etched; therefore, one skilled in the art would determine the chemical concentration through test run in order to obtain the optimum chemical concentration for the etching with a reasonable expectation of success.

Response to Arguments

6. Applicant's arguments filed 10/1/02 have been fully considered but they are not persuasive.

Applicant's argument that Shiramizu solution does not necessarily have the same etch rate as the claims is found unpersuasive because there is no factual evidence to show so.

Referring to applicant's argument that Shiramizu and Nakano describe a cleaning solution not etching solution; Shiramizu and Nakano solutions would remove metal from the substrate, it would be obvious that their solutions are able to etch metal because etching is also removing metal from the substrate. Furthermore, the claims described as an etching solution that has the metal or metal nitride etch rate. This would describe one of the properties of the solution. They are not described as a metal etching solution. Since Shiramizu and Nakano describe the solution with the same chemicals and concentration, it would inherently has the metal or metal nitride etch rates as the claimed invention.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
December 2, 2002